Electrokinetics across disciplines and continents: an integrated approach to finding new strategies for sustainable development - ELECTROACROSS

Abstract of poster presentation

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P-05 Electrokinetics across disciplines and continents: an integrated approach to finding new strategies for sustainable development – ELECTROACROSS

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Abstract
The project entitled "Electrokinetics across disciplines and continents: an integrated approach to finding new strategies for sustainable development – ELECTROACROSS" was approved under the frame of FP7-PEOPLE-2010-IRSES. Having commenced only recently, the project will be conducted for the duration of 4 years. The main aim of this project is to establish a long-lasting collaboration and create a network of European and other continents' research centers of excellence, to explore new strategies for sustainable development, using electrokinetics (EK) in different disciplines, including recovery, remediation and conservation. This overall goal will be achieved by undertaking joint research activities, to create advanced synergies among fundamental research, applied science and innovation. The joint research activities and collaborations will be facilitated by providing the opportunity to individual researchers to pay extended visits to each others' centers and laboratories between Europe and Third Country Partners. With some Partners (European ones, Chile and Australia) it will be a reinforcement of already existing relationships; with others (Brazil, China, Russia and USA) it will involve the establishment of new relationships.

The major societal objective is to address the problem of ever increasing pressures on land resources that create competition and conflicts and result in suboptimal use of these resources through expanding economic activities and human demands. Contaminated soil and a great deal of waste products are currently disposed of in landfills. The call for more sustainable solutions is decisive to support waste strategies. This project opens new technical possibilities for waste minimization, through upgrading of particulate waste products and the recovery of secondary resources for industrial use. The envisioned use of sustainable EK processes in resource recovery, remediation and conservation is a triple-prong approach, with worldwide interest.

The specific objectives of this project are: i) to promote a venue to successfully merge the world wide EK research and development; ii) to gain fundamental knowledge on EK processes; iii) to explore the use of EK processes in developing methods to minimize the amount of waste directed to landfill and reduce excessive mining of primary resources; iv) to explore the use of EK processes for the recovery of elements with value as fertilizer ingredients (P, K and Ca); v) to develop EK related technologies for manufacturing novel materials; vi) to explore and develop EK enhanced procedure(s) for testing of bio-ashes and relating their characteristics to the properties of cement based materials (aimed for inclusion in European Standards); vii) to characterize mechanical, physical and chemical properties of the synthesized (e.g. cement based) materials; viii) to develop and implement new advanced analytical techniques to study in depth the chemical dynamics and removal kinetics of the EK process and the process dependent composition of the test matrices ix) to explore synergistic technologies to enhance EK remediation of polluted soils; x) to extend EK processes to the preservation of "azulejo" cultural heritage; xi) to establish venues to disseminate, transfer and/or market for the solutions developed in this project.

To achieve these objectives, a multidisciplinary consortium of 40 specialists in areas such as chemical and environmental sciences, and civil-, chemical-, and environmental- engineering, was created with the aim of developing new strategies for sustainable recovery, remediation and conservation of resources through efficient use of EK processes and technologies.